

RADIAL LINES IN RÖNTGEN INTERFERENCE PATTERNS.

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At the 'Naturforschersammlung,' 1913, W. Friedrich described the appearance of radial lines in the interference patterns of common salt and sylvine.*)

These radial lines he attributes to the two dimensional grating effect of the three dimensional grating of the crystal, and the points to the three dimension grating effect of the same space-lattice.

M. von Laue and the author pointed out that the "point pattern" is determined by the three constants of the grating, and that if one of these constants vanish or become small in comparison to the remaining two then the grating is principally a two dimensional one which will produce radial interference lines.†)

This view is supported by experiments on magnesium-hydroxide.

This substance shows the usual point pattern, but after the water molecules are expelled by long-continued heating, then it becomes brittle and *only* produces radial lines in the pattern.

Biotite produces the usual pattern, but after treatment with acids—"Baurit aus Biotit"—shows no pattern whatsoever in spite of the fact that it still appears—macroscopically—to be crystalline.‡)

Microcrystalline substances generally show radial lines and some small points. The latter are probably due to "regular units" in the crystal.

If a crystal is built up of elementary units which are arranged in all possible directions, then even if each unit be a miniature crystal, these will not produce an "interference pattern" but a high dispersion.

Crystals from sublimated iodine show both radial lines and "shaded" points on the pattern. This seems to indicate that the third elastic constant is almost a negligible quantity.

A crystal of iodine—cut at Göttingen—only showed a large number of small points but no radial lines after the same exposure as the former crystal.

* W. Friedrich, 'Phys. Z. S.,' 14, 1079, 1913.

† M. v. Laue and J. Stéph. v. d. Lingen, 'Naturwissenschaften,' 13, 328, 1914.

‡ "Baurit aus Biotit," prepared by Prof. Rinne, Leipzig.

These results seem to indicate that there is a marked difference between the elastic constants of the two crystals.

The analysis of these radial lines is of great importance in determining the mechanical properties not only of crystals but also of raw materials for engineering.

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